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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

B. DOPP, Y. SHRIM, M. ABRAMSON**Examiner: Mark Ruthkosky****Serial No.: PCT/US99/28253****Filed: 30 November 1999****For: METAL CELL AND CATHODE
CONNECTION****22249**

PATENT TRADEMARK OFFICE

RESPONSE TO WRITTEN OPINIONBOX PCT
Commissioner for Patents
Washington, D.C. 20231**EL616997982US**

Sir:

This reply is submitted in response to the written opinion mailed 10 October 2000 relating to the above-captioned patent application. Examiner indicated that all the examined claims 1-26 were novel. The Examiner, however, found that claims 1 and 4-17 lacked inventive step over Dopp (US Patent No. 4,791,034) in view of Delmolino (US Patent No. 5,554,452), Morishita (US Patent No. 5,827,621), Holland, et. al. (US Patent No. 5,472,802), or Oltman (US Patent No. 4,687,714). Also, the Examiner found that claims 18-27 lacked inventive step over these references in further view of Mansfield (US Patent No. 5,279,905) or Ohashi (US Patent No. 5,306,578).

With regard to claim 1, the Examiner stated that Dopp teaches an electrochemical cell showing casing elements mutually engaged to form a cell and, while Dopp does not show or teach a prismatic cell, Delmolino (as well as Morishta, Holland, and Oltman) provides motivation to form the cell of Dopp in a prismatic shape. Applicant respectfully proposes

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that, as discussed in the Background of the Invention section of the present (PCT/US99/28253) application, the creation of a button cell, such as Dopp's, in the form of a prism, would fail to meet the limitations of claim 1. Specifically, such a structure would not meet the claimed recitation:

each of said casing elements having respective shapes such that when a distal portion, proximal of said peripheral edge, of said second casing element side walls is curved over said proximal bend of said first casing element to form a curved portion that may engage said first casing element, stresses tending to corrugate said peripheral edge are reduced to a level such that substantially no corrugation would occur.

The Dopp design, as is true of all button cells, reduces the diameter of the opening of the lower casing by forging the rim (edge) of the lower casing. The resulting hoop strength supplies the cell of Dopp with integrity avoiding any need to have "side walls curved over said proximal bend" as recited in claim 1. Further, the recited structure generates the potential for corrugation which is avoided by Dopp because of the fact that there is no need to form the casing as recited. Thus, there are no "stresses tending to corrugate said peripheral edge" in Dopp as recited in claim 1. These stresses only result when the cell kit provides a cell with "side walls curved over said proximal bend."

In addition, Applicant respectfully notes that there is no motivation to combine the button cell structure of Dopp to a prismatic cell because, in a prismatic cell, the crimp of Dopp would be ineffective to seal the resulting cell as would be understood by a skilled designer. Specifically, such a cell design would not seal along the straight portions of the cell for lack of the inherent hoop strength on which Dopp relies.

Thus, Applicant respectfully proposes that while prism-shaped cells are motivated by the cited references, the Dopp reference (and all button cell references known to the Applicant) are unsuitable for application to the problem of making a prism-shaped cell. In addition, even when the references are combined, the result still does not meet the limitations of claim 1 as discussed above. Therefore, withdrawal of the finding that claim 1 lacks inventive step is respectfully solicited.

With regard to claim 4, the Examiner stated that in Dopp, “the [redacted] of the walls of the inner casing are different than the outer casing and the bends in the casings are different at various sites (see Figures).” Applicant respectfully traverses the Examiner’s conclusion of lack of inventive step. Claim 4 recites, in relevant part, “a distance between said edge and said proximal bend of said second casing element is shorter at said corner portions than elsewhere.” While Applicant agrees, as the Examiner points out, that Dopp shows various bends at different locations, claim 4 compares a specific distance, that between the edge and proximal bend, at corners with the same distance elsewhere. Dopp has no corners and no variation at all of the “distance between said edge and said proximal bend” since Dopp is cylindrically symmetric. None of the cited references, alone or in concert, shows or motivates the quoted features recited by claim 4. For these reasons and because claim 4 includes the limitations of claim 1, Applicant respectfully requests withdrawal of the Examiner’s finding of lack of inventive step with regard to claim 4. Further, Applicant respectfully requests the same be entered with respect to claim 5 and 6 which depend from claim 4 and therefore contain at least the inventive step limitations of claim 4.

With regard to claim 7, Applicant requests entry of an amendment to claim 7 as indicated in the replacement attached sheets. Claim 7 is amended as follows, with underscoring identifying the modified language.

said second casing element has recesses in immediate vicinities of said second casing element proximal bend and said second casing element corner portions; and

said peripheral edge follows a shape defined by said recess such that said peripheral edge is closer to said major wall in a vicinity of said corner portions than along said straight portions.”

With the above amendment, it is clear than none of the cited references, alone or in combination, shows or suggests a structure as recited in claim 7. As discussed with reference to claim 1, none of the references indicates a context in which the limitations of claim 7 would be motivated. Further, claim 7 contains the limitations of claim 1. For the foregoing reasons, Applicant respectfully requests withdrawal of the finding of lack of inventive step.

With regard to independent claim 8, the Examiner stated: "th of the walls of the inner casing are different than the outer casing and the bends in the casings are different at various sites (see Figures)." Applicant proposes to amend claim 8 to make clearer the structure of the cell. Applicant respectfully draws the Examiner's attention to the recitation in claim 8 with the proposed modifications highlighted by underscoring, the changes being included in the attached replacement sheets.

said side wall of said first casing element having a distal edge portion wrapped over said second casing element to define a bend in said distal edge portion effective to mutually engage said first and second casing elements; and

at least one of said first and second portions being shaped such that said bend in said distal edge portion has a smaller range of curvature near said corners than further from said corners, whereby a compressive strain of said distal edge portion is minimized.

Neither Dopp nor the other references shows any suggestion of the recited structure. While various bends exist in the Dopp housing, none includes a "side wall ... distal edge portion ... bent through a smaller range of curvature near said corners." Dopp has no corners and Dopp, applied to a prismatic shape, provides no motivation for forming a cell with the recited structure. Furthermore, none of the references indicates any motivation for the recited structure in which the curvature near corners is different from the curvature further from the corners. For the foregoing reasons, Applicant respectfully requests that the finding of lack of inventive step be withdrawn. Applicant respectfully requests the same finding for claim 9 since it depends from claim 8 and contains the limitations of claim 8 therefore.

With regard to independent claim 10, the Examiner indicated that the combination of Dopp and Delmolino references showed a lack of inventive step. Applicant has amended claim 10 to make clearer the distinction between it and the prior art. The underlined language in the following is added to claim 10 in the accompanying replacement sheets.

said recess and said ledge being shaped such that when the electrode is supported by said ledge, the electrode may remain substantially

perpendicular to said side walls without bending despite the electrode extending all the way to said side walls

In Dopp and all the other references cited, the corner where the major plane of the cell meets the vertical walls, the cathode being supported on the major plane, has a curvature. Furthermore, this "proximal bend" is such that the cathode is supported so that, where it extends up to the side wall, it must bend upwardly due to this curvature. Applicant's specification teaches, for example, to make a trough around the perimeter to prevent this. This approach is embraced by the language from claim 8 quoted above, which requires that the proximal bend be such that the electrode may remain substantially perpendicular to the side walls without bending despite the electrode extending all the way to said side walls. The recited limitations of claim 10 cannot be met by the configurations shown in the prior art or any suggested by the references. For the foregoing reasons, Applicant respectfully withdrawal of the finding of lack of inventive step because none of the cited references shows any motivation for the structure recited in claim 10. Applicant also respectfully requests that the conclusion of lack of inventive step be withdrawn with regard to claims 11-13 since these claims contain an inventive step as a result of their dependence from claim 10.

Applicant proposes to amend claim 11 by replacing the term "planar projection" with the term "plane" since the latter more precisely describes the structure intended to have been defined by the claim. The replacement sheets attached contain the claim 11 so amended.

With regard to claim 14, the Examiner indicated that the combination of Dopp and Delmolino references demonstrated a lack of inventive step. Claim 14 recites "said major wall having protrusions to support a generally planar cathode ... said major wall being shaped such that when the electrode is supported by said protrusions, the electrode may remain substantially parallel to said major wall." Applicant directs Examiner's attention to the fact that none of the references describe or suggest protrusions in the major wall supporting the cathode which are structured as recited. In Dopp, and all the other references cited, at the surface where the cathode is supported there is a curvature forcing the edge of the cathode upwardly. Thus, the recited limitations cannot be met by this art. For the foregoing reasons, Applicant respectfully requests withdrawal of the finding of lack of inventive step because none of the cited references shows any motivation for the structure recited in claim 14.

With regard to claim [REDACTED] Applicant requests entry of the amendment shown in the accompanying replacement sheets. Claim 15 is amended by adding the clarifying language: "without bending said cathode" at the end of the claim. Claim 15 now recites:

said proximal bend defining a recess and a ledge, said recess being proximal to said side walls and said ledge being proximal to said major wall;
 said ledge being shaped to support a generally planar electrode so that said electrode is substantially parallel to said major wall;
 said recess and said ledge being shaped such that when the electrode is supported by said ledge, the electrode may be pressed against the inner surface of the casing element proximal to said proximal bend when said casing element is mutually engaged with said second casing element without bending said cathode.

As discussed, above in connection with claims 10 and 14, neither the Dopp reference nor any of the recited references could meet this limitation since they would all cause the cathode to bend in such a way that the cathode cannot be perpendicular to the side walls throughout, as recited. The bend is particularly conspicuous in the figure of Mansfield. For the foregoing reasons, Applicant respectfully proposes that claim 15 shows an inventive step because none of the cited references shows any motivation for the structure recited in claim 15. Applicant also respectfully requests that the conclusion of lack of inventive step be withdrawn with regard to claim 16 since it contains an inventive step at least as a result of its dependence from claim 15.

With regard to claim 17, Applicant requests entry of the amendment shown in the accompanying replacement sheets. Claim 17 is amended by adding the clarifying language: "throughout an entirety of a plane of said air cathode" to the end of the claim. Claim 17 now recites "said tray shaped casing element shaped to support a generally planar air cathode a distance from said major wall, said air cathode supported in a position to contact said dependent side walls perpendicular thereto throughout an entirety of a plane of said air cathode." As discussed, above in connection with claims 10 and 14, neither the Dopp reference nor any of the recited references alone or in combination could meet this limitation since they would all cause the cathode to bend in such a way that the cathode cannot be

perpendicular to the side wall throughout, as recited. For the foregoing reasons, Applicant respectfully request that the finding that claim 17 lacks inventive step be withdrawn.

Applicant also respectfully requests that the conclusion of lack of inventive step be withdrawn with regard to claims 18-22 since these claims contain an inventive step at least as a result of their dependence from claim 17.

If the Examiner requires clarification of any issues raised in this response, the Examiner is invited to call the undersigned at (914) 421-4621.

Respectfully submitted,

LYON & LYON LLP



Dated: 11 December 2000

By: Mark Catan

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1 6. A casing as in claim 4, wherein said respective shape includes a shape of said
2 second casing element is such as to have at least one recess in an immediate vicinity of a said
3 second casing element proximal bend and of a said corner portion, and a shape of said second
4 casing element peripheral edge follows a shape of said at least one recess.

1 7. A casing as in claim 1, wherein:
2 said second casing element has recesses in immediate vicinities of said second casing
3 element proximal bend and said second casing element corner portions; and
4 said peripheral edge follows a shape defined by said recess such that said peripheral
5 edge is closer to said major wall in a vicinity of said corner portions than along said straight
6 portions.

1 8. A leak proof casing for an electrochemical cell comprising:
2 first and second casing elements mutually engageable to form a prismatic enclosure;
3 said first casing element having a planar major wall and a single continuous depending
4 side wall perpendicular to said major wall and joined to said major wall at a proximal bend,
5 whereby said side wall and said major wall enclose a prism-shaped volume;

6 said side wall having straight portions and curved corner portions where said straight
7 portions meet;

8 said side wall of said first casing element having a distal edge portion wrapped over
9 said second casing element to define a bend in said distal edge portion effective to mutually
10 engage said first and second casing elements; and

11 at least one of said first and second portions being shaped such that said bend in said
12 distal edge portion has a smaller range of curvature near said corners than further from said
13 corners, whereby a compressive strain of said distal edge portion is minimized.

1 9. A casing as in claim 8, wherein a portion of a curve formed by said distal portion
2 of said second casing element has a radius of curvature that is greater than a radius of
3 curvature of a portion of the proximal bend of the first casing element that is closest to said
4 distal portion of said second casing element.

1 10. A leak-proof casing for an electrochemical cell comprising:
2 first and second tray-shaped casing elements, each casing element having a generally
3 planar major wall with generally perpendicular dependent side walls, said side walls meeting
4 said major wall at a proximal bend that circumscribes said major wall;
5 said casing elements being mutually engageable to form a prism-shaped enclosure;

said proximal bend of at least one of said casing element defining a recess and a ledge;
said ledge being shaped to support a generally planar electrode so that said electrode is
substantially parallel to said major wall; and

said recess and said ledge being shaped such that when the electrode is supported by
said ledge, the electrode may remain substantially perpendicular to said side walls without
bending despite said electrode extending all the way to said side walls.

11. A leak proof casing as in claim 10 wherein said recess and ledge are shaped such
that a portion of said recess of said at least one of said casing element is disposed on a same
side of a plane of said ledge as said major wall.

12. A leak proof casing as in claim 10 wherein said ledge is shaped such that when the
electrode is supported by said ledge, said generally planar electrode is offset from said
generally planar major wall.

13. A leak proof casing as in claim 10 wherein said at least one of said casing elements
includes two separate casing elements.

14. A leak-proof casing for an electrochemical cell comprising:

first and second tray-shaped casing elements, each casing element having a generally
planar major wall with generally perpendicular dependent side walls, said side walls meeting
said major wall at a proximal bend that circumscribes said major wall;

said casing elements being mutually engageable to form a prism-shaped enclosure;

said major wall of at least one of said casing element having protrusions to support a
generally planar electrode so that said electrode is substantially parallel to said major wall;
and

said major wall being shaped such that when the electrode is supported by said
protrusions, the electrode may remain substantially perpendicular to said side walls without
bending.

15. A tray shaped casing element for an electrochemical cell comprising:

a tray shaped casing element having a generally planar major wall with generally
perpendicular dependent side walls, said side walls meeting said major wall at a proximal
bend that circumscribes said major wall;

said tray shaped casing element being mutual engageable with a second casing
element to form a prism shaped enclosure;

7 said proximal bend defining a recess and a ledge, said recess being proximal to said
8 side walls and said ledge being proximal to said major wall;

9 said ledge being shaped to support a generally planar electrode so that said electrode is
10 substantially parallel to said major wall;

11 said recess and said ledge being shaped such that when the electrode is supported by
12 said ledge, the electrode may be pressed against the inner surface of the casing element
13 proximal to said proximal bend when said casing element is mutually engaged with said
14 second casing element.

1 16. A casing element as in claim 14 wherein said recess and said ledge is shaped such
2 that when the electrode is supported by said ledge, an edge of the electrode is within the
3 confines of said recess when said casing element is mutually engaged with said second casing
4 element.

1 17. A tray shaped casing element for an electrochemical cell comprising:
2 a tray shaped casing element having a generally planar major wall with generally
3 perpendicular dependent side walls, said side walls meeting said major wall at a proximal
4 bend that circumscribes said major wall;

5 said tray shaped casing element being mutual engageable with a second casing
6 element to form a prism shaped enclosure;

7 said tray shaped casing element shaped to support a generally planar air cathode a
8 distance from said major wall, said air cathode supported in a position to contact said
9 dependent side walls perpendicular thereto throughout an entirety of a plane of said air
10 cathode.

1 18. A tray shaped casing element as in claim 17 wherein said major wall has a raised
2 portion, said raised portion supporting said air cathode.

1 19. A tray shaped casing element as in claim 18 wherein said raised portion defines a
2 ledge around a perimeter of said major wall.

1 20. A tray shaped casing element as in claim 18 wherein said raised portion is a
2 plurality of protrusions formed on said major wall and distributed over said major wall.

1 21. A tray shaped casing element as in claim 17 wherein said support includes a
2 support structure disposed between said major wall and said air cathode such that a direct
3 contact of said major wall and said air cathode is prevented.

1 22. A tray shaped casing element as in claim 17 wherein said casing element include
2 two separate casing elements, a major casing element being a tray shaped structure having a
3 generally planar wall and dependent side walls and a minor element being shaped to support
4 said generally planar air cathode a distance from said major wall.

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Docket No: 248/084
Serial No.: PCT/US99/28253
Filed: 30 November 1999
Mark: METAL CELL AND CATHODE CONNECTION

Express Mail: EL616997982US
Attorney: Mark A. Catan

RESPONSE TO WRITTEN OPINION

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